

# Active Vibration Isolation System for Mobile Launch Platform Ground Support Equipment, Phase II

Completed Technology Project (2009 - 2011)



## Project Introduction

During our Phase I STTR effort, Balcones Technologies, LLC and The University of Texas Center for Electromechanics (CEM) successfully achieved all Phase I objectives and developed a concept design for an active Vibration Isolation System (VIS) that fully meets all requirements defined or implied in STTR 2007-1 Subtopic T6.02. Now the Balcones Technologies - CEM team proposes to develop, test, and deliver a prototype version of our active VIS. Furthermore, the delivered prototype system, coupled with our proposed Phase II commercialization activities, will be substantially advanced from a proof-of-principle system and will embody the critical aspects of pre-production systems, ready to quickly transition to the NASA qualification process and finished product. Our Phase I effort yielded a high performance, cost effective, highly reliable, actively controlled Vibration Isolation System (VIS) for ground support electronics racks or groups of racks on the Mobile Launch Platform (MLP). Some features are listed below. does not rely on predictable vibration input applies across broad range of ground support electronics or other sensitive systems does not depend on detailed knowledge or testing of the components being protected is compatible with operation from a self-contained power supply if desired by NASA offers up to 18x reduction in payload peak accelerations compared to passive approaches and up to 5x reduction compared to semi-active approaches can be configured to isolate electronics racks individually, in small groups, or via an isolation system for an entire floor is modular in both hardware and software, exploiting COTS and previously developed CEM technology to facilitate rapid development and commercialization exploits approximately \$24M of highly successful active suspension R&D at CEM for military vehicles for the controls, architecture, and actuator development technology.

## Anticipated Benefits

Potential NASA Commercial Applications: Our active VIS will initially focus on niche applications that exploit its high performance, modularity, and scalability. This includes a wide range of military and non-military applications. Military applications focus on equipment on ships, vehicles, and aircraft and some ground equipment and have potential for growth to more general military equipment that can yield very large markets, especially for ship borne applications. Although ships are in constant motion, which is sometimes harsh during high sea-states, the most stringent requirements are during combat which lead to severe shock rating requirements of 50 g's or more. Non-military applications involve commercial applications where our VIS could provide sufficient vibration isolation to allow use of commercial instrumentation in applications which heretofore have required specialized hardware. Customers we have initially identified include oilfield service groups such as Baker Hughes, Dresser, Schlumberger, Weatherford, Welltec, and WesternGeco. The electronics industry, with a large base in Austin, Texas, also has a need for vibration isolation for some of their process and possibly using



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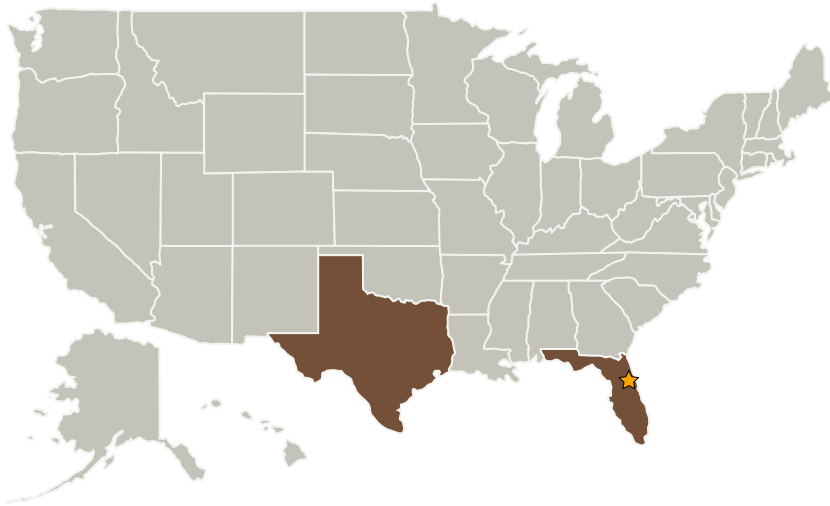
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our VIS actively controlled/programmable actuators in a shaker table role to induce vibrations into electronics equipment that must be tested for vulnerability to vibration. A sampling of the large electronics companies with a significant presence in Austin includes, National Instruments, IBM, AMD, Samsung, and Motorola.

## Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★ Kennedy Space Center(KSC)	Lead Organization	NASA Center	Kennedy Space Center, Florida
Balcones Technologies, LLC	Supporting Organization	Industry	Austin, Texas
University of Texas - Center for Electromechanics	Supporting Organization	Academia	Austin, Texas

## Primary U.S. Work Locations

Florida	Texas
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## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

### Lead Center / Facility:

Kennedy Space Center (KSC)

### Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

### Program Director:

Jason L Kessler

### Program Manager:

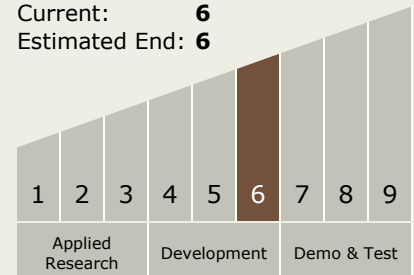
Carlos Torrez

### Principal Investigator:

Joseph H Beno

## Technology Maturity (TRL)

Start: 6  
Current: 6  
Estimated End: 6



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## Project Transitions



**October 2009:** Project Start



**June 2011:** Closed out

**Closeout Summary:** Active Vibration Isolation System for Mobile Launch Platform Ground Support Equipment, Phase II Project Image

## Technology Areas

### Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - └ TX05.5 Revolutionary Communications Technologies
    - └ TX05.5.3 Hybrid Radio and Optical Technologies